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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,256	12/19/2000	Alan R. Reinberg	MCRO:106--2/FLE	5857

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EXAMINER

TRAN, THIEN F

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 05/21/2002

#6

Please find below and/or attached an Office communication concerning this application or proceeding.

* 76056

Office Action Summary

Application No.

09/740,256

Applicant(s)

REINBERG ET AL.

Examiner

Thien F Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-76 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 32-36, 38, 39, 41-51, 53, 54, 56-66, 68, 69 and 71-76 is/are rejected.
- 7) ☒ Claim(s) 37, 40, 52, 55, 67 and 70 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 32-33, 38-39, 41-48, 53-54, 56-63, 68-69 and 71-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley (US 3,886,577) in view of Klersy et al. (US 5,536,947).

Buckley discloses an X-point memory cell (Fig. 6) comprising: an access device (28, 30); a memory element 1' operatively coupled to the access device, the memory element comprising: dielectric material 2a' having a pore 24 therein; a first electrode 4' disposed within the pore; a memory material (6', 32) disposed over the first electrode; and a second electrode (8a', 8b') disposed over to the memory material. The current photolithographic limit is about 0.2 um. Buckley does not disclose the pore diameter is smaller than 0.2 um. Klersy et al. discloses a memory cell wherein the pore diameter is as low as 0.01um (col. 17, lines 20-23). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the pore diameter of Buckley as small as taught by Klersy et al. in order to lower the energy requirements for electrical switching. Buckley further disclose a first conductive line 26 extending in a first direction; a second conductive line 33 extending in a second direction different than the first direction, the first conductive line and the second conductive line being spaced

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apart by a portion of a substrate, the second conductive line intersecting the first conductive line in an overlapping manner to form an area of intersection in the portion of the substrate, the access device (diode) wholly disposed in the area of intersection, the access device (diode) being operatively coupled to the first conductive line, the memory element 1' wholly disposed in the area of intersection.

Regarding claims 33, 48 and 63, the access device (30, 28) comprises a diode.

Regarding claims 38, 53 and 68, the second electrode is comprised of a plurality of layers (8a', 8b').

Regarding claims 39, 54 and 69, the second electrode is comprised of a plurality of materials.

Regarding claims 41-46, 56-61 and 71-76, the memory material 6' comprises structure changing material of a chalcogenide material which inherently changes between different states of crystallinity in response to electrical stimulus, wherein each of the different states of crystallinity corresponds to a given resistance level. The chalcogenide material comprises a programmable resistive element that changes between different resistance levels in response to electrical stimulus.

Claims 34, 49 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley (US 3,886,577) in view of Klersy et al. (US 5,536,947) as applied to claims 32, 47 and 62 above, and further in view of Wang et al. (US 4,616,404).

The modified Buckley as described above discloses p-region 30 disposed adjacent n-region 28 forming a diode. Buckley does not disclose p-region 30 comprising polysilicon and n-region 28 comprising polysilicon. Wang et al. discloses a polysilicon

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diode comprising a layer of N doped polysilicon and a layer of P doped polysilicon. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the p-region 30 of polysilicon and the n-region 28 of polysilicon to form a polysilicon diode with low reverse current leakage and low series resistance permitting high current flow.

Claims 35-36, 50-51, 65-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckley (US 3,886,577) in view of Klersy et al. (US 5,536,947) as applied to claims 32, 47 and 62 above, and further in view of Ovshinsky et al. (US 5,414,271).

The modified Buckley as described above does not disclose the first electrode 4' comprised of a plurality of layers and a plurality of materials. Ovshinsky et al. discloses the first electrode comprising two layers (32 and 34) of different of materials (carbon and molybdenum). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to form the first electrode 4' of the modified Buckley comprising two layers of the materials as taught by Ovshinsky et al. in order to form excellent electrical contacts with the memory material 6'.

Allowable Subject Matter

Claims 37, 40, 52, 55, 67 and 70 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the allowance of the claims is the inclusion of the

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limitations "the first electrode comprises a layer of carbon; and a layer of titanium nitride disposed adjacent the layer of carbon" in claims 37, 52 and 67; and "the second electrode comprises a layer of carbon; and a layer of titanium nitride disposed adjacent the layer of carbon" in claims 40, 55 and 70 which are not found in the prior art references.

Response to Arguments

Applicant's arguments filed 03-12-2002 have been fully considered but they are not persuasive.

Applicant argues that the Buckley reference does not disclose an X-point memory cell where the access device is wholly disposed in the area of the intersection of the digit line 26 and the word line 33 or where the chalcogenide memory element is wholly disposed in the area of intersection. The examiner respectfully disagrees with the remark because the Buckley reference clearly shows the word line 33 and the digit line 26 crossing each other; therefore, there must be an X-point (intersecting area) where the two lines intersect (cross section of Fig. 6). Furthermore, it is noted that the features upon which applicant relies (i.e., where the access device is wholly disposed in the area of the intersection of the digit line 26 and the word line 33 or where the chalcogenide memory element is wholly disposed in the area of intersection) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

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In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien F Tran whose telephone number is (703) 308-4108. The examiner can normally be reached on 7:00AM - 3:30PM Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers

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for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

tt
May 16, 2002

Steve Lake